ANGLER SEGMENTATION USING PERCEPTIONS OF EXPERIENTIAL QUALITY IN THE GREAT BARRIER REEF MARINE PARK

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Abstract.—This study investigated the efficacy of segmenting anglers using their perceptions of trip quality in the Great Barrier Reef Marine Park (GBRMP). Analysis revealed five segments of anglers whose perceptions differed on trip quality. We named the segments: slow action, plenty of action, weather sensitive, gloomy gusses, and ok corral and assessed variation among them with respect to gender, fishing experience, targeting particular fish species, motivations, and satisfaction. There were limited significant differences across the motivation dimensions while the satisfaction dimensions had the largest variation. Despite insignificant differences among catch propensity motivations and overall lower mean values, catch-related outcomes had the greatest variance among segments in the satisfaction dimension. This kind of information can be useful for marine park fisheries managers who need to take into account both generalized angler data and local baseline data that reflects the specific geographic context when creating fisheries policies.

1.0 INTRODUCTION

One of the major challenges of managing recreational fisheries in marine protected areas is facilitating satisfactory experiences across a broad spectrum of anglers (Fisher 1997). Identification and integration of stakeholders' needs can help generate management strategies that increase participant adoption, reciprocity, and resource stewardship.

Providing quality outdoor recreation opportunities that ultimately lead to satisfying experiences has long been recognized as natural resource managers' primary goal (Manning 1999). Provision of quality experiences is a fundamental goal for the Great Barrier Reef Marine Park Authority (GBRMPA) and an obligation laden with economic, legal, and managerial implications. Recreational anglers are important stakeholders for fishery resource management agencies and are contributors to the local, regional, and national economies (Finn and Loomis 2001). As part of a $4.2 billion Australian dollar tourism industry, an estimated 800,000 recreational fishers contribute more than $240 million annually to the Great Barrier Reef Marine Park (GBRMPA 2010). The GBRMPA is mandated under federal law to conserve and protect the biodiversity of the Great Barrier Reef (GBR) ecosystems and to provide opportunities and access for current and future generations to engage in ecologically sustainable use of the GBRMP (Day 2002). Failure to provide quality angling experiences will likely lead to a decrease in angling participation (and related expenditures), and, eventually, loss of support for fishery management programs (Finn and Loomis 2001).

Research investigating the quality of angling excursions can engage the angling community as a policy partner, customer, and valued resource. Such research also helps build a sense of community, reciprocity, and stakeholder ownership that is necessary for successful fisheries management. The purposes of this study are: 1) to assess using perceptions of experiential trip quality as a method for differentiating homogeneous angler groups from a larger heterogeneous population; and 2) to examine variation across these groups with respect to gender, fishing experience, tendency to target particular fish species, motivations, and satisfaction.

1.1 Background

The Great Barrier Reef Marine Park (GBRMP) was established by an Australian federal act in 1975 and is managed by the GBRMPA to provide for the protection, wise use, understanding, and enjoyment of the Great Barrier Reef in perpetuity (Day 2002). The GBR, a World Heritage Area, is the largest coral reef ecosystem in the world, comprised of over 2,900 individual reefs and nearly 1,000 islands and caves that extend for 2,000 kilometers along the northeastern Australian coast (GBRMPA 2010). Regarded worldwide as the gold standard in ecosystem-based management (Norse 2010), the GBRMPA manages a wide range of recreational and commercial activities within the marine park and is responsible for ensuring the ecological integrity of over 347,800 km^2 of marine habitat.

The GBRMPA's core management ideology underscores the valuable contribution of public participation and community involvement. Research has shown that anglers can be strong supporters of fisheries management initiatives if they are engaged in the decision making process and if policies reflect anglers' values (Sutton and Tobin 2009). A successful multi-use marine zoning approach must recognize the dynamic nature of angler populations and perceptions of quality regarding angling experiences (Wagar 1964).

1.2 Background Literature

Perceptions of experiential quality are subjective (Graefe and Fedler 1986) and multi-dimensional (Driver and Knoff 1976, Hendee 1974) and are the product of individuals' socio-demographic (Fedler and Ditton 1986) and psychological perspectives (Driver and Cooksey 1977). Previous research has revealed that recreationists have a range of views about what constitutes a quality experience and that the "average angler" does not exist (Bryan 1977, Fedler and Ditton 1986, Shafer 1969). Fisheries management policies that fail to take this into account may satisfy no one (Fisher 1997). In order to successfully serve a large angler constituency, fisheries management must provide satisfying fishing opportunities and experiences (Schramm 2003) to multiple subgroups within a larger angler population (Bryan 1979). However, in order to do this, marine managers must identify the various angler constituencies, their interests, and the associated determinants of quality experiences (Fisher 1997).

Segmentation facilitates identifying distinct segments of a population with like preferences, which provides the potential for targeted management via policy development, marketing, or education (Kyle et al. 2007). Researchers have segmented anglers on a wide range of constructs, characteristics, and orientations including socio-demographic characteristics (Ditton 1985, McGurrin 1988, Sutton 2005), specialization (Bryan 1977, Chipman and Helfrich 1988, Ditton et al. 1992), consumptive orientation (Aas and Kaltenborn 1995, Fedler and Ditton 1986, Kyle et al. 2007), participation (Bryan 1977, Graefe 1980), motivations (Driver and Cooksey 1977, Fedler and Ditton 1994, Moeller and Engelken 1972, Spencer 1993), satisfaction (Holland and Ditton 1992, Schramm 2003), and trip quality (Sutton 2005), and examined each of these using indicators across multiple dimensions.

Identification of attributes that add to or detract from the quality of a fishing trip informs decisions makers about the degree to which they can positively influence satisfying fishing experiences via management strategies. Quality has been defined in outdoor recreation as the "relationship between satisfactions anticipated in an outdoor experience and the satisfactions realized" (Hendee 1974); measurements of quality can be used to assess the importance of various attributes and determinants of recreation experiences (Hammitt et al. 1993, Sutton 2005). This study uses quality of experience, defined as the quality of service attributes that are under the control of the provider, as well as the recreationist's psychological outcomes (Crompton and Love 1995), to assess which attributes add to or detract from the quality of a fishing trip.

2.0 METHODS

The study site was the Townsville public boat ramp in Queensland, Australia, which lies near the latitudinal midpoint of the GBRMP. Data were collected during the spring (September-November) of 2006 and fall (April-June) of 2007 between the hours of 10 a.m. and 6 p.m. Over the course of 24 sampling days, 257 interviews were conducted with recreational anglers at the boat ramp as they returned from fishing excursions. An individual from each fishing party was randomly selected and approached to participate in the fishing study. Interview days were selected based on favorable weather conditions (e.g., when the wind was less than 15 knots) in hopes of encountering more offshore anglers.

3.0 DATA ANALYSIS AND RESULTS

3.1 Survey Participants

Most of the survey participants fished the inshore islands and reefs with only 14.4 percent venturing to the outer reef. The sample was predominantly male (82.6 percent), and 94.6 percent of the fishing trips lasted less than 24 hours. About 86 percent of participants were fishing in small groups of two to four people. Survey participants were experienced anglers overall, on average reporting 25.4 years of fishing experience.

3.2 Quality of Angler Experiences

Principle Components Analysis (PCA) was used to group 14 items on perceptions of experiential quality into latent dimensions. Respondents were asked to evaluate the quality of the fishing trip's attributes on a 5-point scale ranging from 1 (detracted greatly) to 5 (added greatly). Five new representative quality variables were created: fishing (number caught, size, species, number of bites), weather (weather, scenery, sea conditions), equipment (tackle, boat), surrounding (other activities engaged in beside fishing, cleanliness of environment, facilities), and other life (people, wildlife) (Table 1).

3.3 Angler Segmentation

PCA dimensions (K-means cluster procedure) were then used to cluster respondents into homogeneous groups based on their experiential quality profiles. After examining several cluster solutions based on cluster size and distinctness (Payne 1992), we selected a five cluster solution: Slow Action, Plenty of Action, Weather Sensitive, Gloomy Gusses, and OK Corral (Table 2). Emergent clusters were examined using indicators of gender, fishing experience, targeting particular fish species, motivations and satisfaction, and overall satisfaction.

Table 1.—Principle components analysis of experiential quality items

Dimension	Quality Item[a]	*M*[b]	*SD*	Loadings	Cronbach's[c]
Fishing	The number of fish you caught	2.97	0.99	0.84	0.85
	The size of the fish you caught	2.96	0.98	0.91	
	Species of the fish you caught	3.03	0.98	0.87	
	The number of bites you had	3.17	0.99	0.67	
Weather	The weather	3.66	1.30	0.93	0.80
	The scenery	4.16	0.76	0.61	
	The sea conditions	3.56	1.31	0.92	
Equipment	The boat you used	4.26	0.75	0.83	0.71
	The fishing equipment you used	4.14	0.79	0.85	
Surroundings	Other activities beside fishing	3.60	0.79	0.79	0.53
	Cleanliness of the environment	3.99	0.77	0.65	
	The facilities you used	3.51	1.01	0.64	
Others	The other people you encountered	3.26	0.69	0.82	0.43
	The wildlife you saw	3.74	0.79	0.69	

[a] How did each of the following factors add to or detract from the quality of your fishing trip today?
[b] Measured on a 5 point scale ranging from 1 (detracted greatly) to 5 (added greatly).
[c] Cronbach's Alpha values of less than 0.7 are not uncommon with scales containing less than 10 items (Pallant 2001).

Table 2.—Principle components analysis of experiential quality items

	Slow Action		Plenty of Action		Weather Sensitive		Gloomy Gusses		OK Corral		
	M[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	F
Fishing	2.60	0.60	3.96	0.59	3.39	0.63	2.01	0.62	3.13	0.39	75.38 ***
Weather	4.64	0.40	4.72	0.31	2.93	0.54	2.42	0.60	3.52	0.57	186.20 ***
Equipment	4.58	0.51	4.29	0.69	4.70	0.40	3.88	0.73	3.70	0.47	33.66 ***
Surrounds	3.67	0.57	3.99	0.56	4.13	0.67	3.46	0.59	3.43	0.48	14.08 ***
Others	3.63	0.60	3.65	0.54	3.85	0.59	3.35	0.67	3.18	0.39	12.81 ***
n	66		46		37		33		75		

*** = $p < 0.001$

[a] Measured on a 5 point scale ranging from 1 (detracted greatly) to 5 (added greatly).

Cross tabulation analysis using Pearson's Chi Square revealed no significant differences between angler segments by gender. Although females were only 16 percent of the respondents, they were evenly distributed across the five quality segments. Additionally, there were no significant differences across the five angler segments between those targeting a particular fish species or between those with different levels of fishing experience.

3.4 Angler Motivation

Motivation was assessed by asking participants to evaluate the importance of 12 different attributes using a 5-point scale ranging from 1 (not at all important) to 5 (extremely important). PCA analysis of the twelve motivation items produced three latent dimensions: nature-solitude (desired proximity to outdoors/nature and peace/tranquility), social escape (wanted to get away from others and routine), and catch propensity (desire for goal oriented catch outcomes) (Table 3). Analysis of variance revealed significant differences between the slow action group and the ok corral group with respect to the nature-solitude dimension. Social-escape motivations for slow action, plenty of action, and weather sensitive were similar in mean scores, and all were significantly different from the ok corral group.

3.5 Angler Satisfaction

Participants were asked to assess their level of agreement with 11 satisfaction items using a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Overall satisfaction was evaluated by inquiring how satisfied they were overall with the day's fishing trip using a 5-point scale ranging from 1 (not at all satisfied) to 5 (extremely satisfied). PCA analysis of the 11satisfaction items produced three latent dimensions: catch-experience (caught desired fish species, caught desired fish size, and had fun), outdoors-relax (good to be outdoors, relaxing), and escape-nature (get away from demands, connected with nature) (Table 4). Analysis of variance revealed significant differences with regard to catch-experience among all groups. The plenty of action group

Table 3.—Analysis of variance – motivation dimensions

	Slow Action		Plenty of Action		Weather Sensitive		Gloomy Gusses		OK Corral			
	M[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	F	df
Nature-solitude	4.09^{AE}	1.90	3.96	0.69	3.90	0.72	3.57	0.96	3.55^{AE}	0.71	2.50*	4
Social-escape	4.28^{AE}	0.71	4.25^{BE}	0.58	4.26^{CE}	0.57	4.03	0.62	3.90^{ABCE}	0.67	4.28**	4
Catch propensity	2.85	1.16	2.91	1.18	3.23	1.07	3.41	3.34	2.76	0.83	1.39	4
n	66		46		37		33		75		66	

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$

[a] Measured on a 5 point scale ranging from 1 (not at all important) to 5 (extremely important).
Like uppercase superscripts indicate significant difference using Tukey's HSD Test at 0.05 level.

Table 4.—Analysis of variance – satisfaction dimensions

	Slow Action		Plenty of Action		Weather Sensitive		Gloomy Gusses		OK Corral			
	M[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	F	df
Catch-Experience	2.44^{ABCD}	0.77	3.35^{ABDE}	1.07	3.05^{ACD}	0.98	1.91^{ABCDE}	0.63	2.65^{BDE}	0.83	16.40***	4
Relax-Outdoors	4.51^{ADE}	0.53	4.59^{BDE}	0.46	4.48^{CD}	0.46	4.08^{ABCD}	0.82	4.22^{ABE}	0.50	7.07***	4
Escape-Nature	3.96	0.84	4.34	0.61	4.20	0.69	4.19	2.51	3.86	0.64	1.74	4
n	66		46		37		33		75		66	

*** = p < 0.001

[a] Measured on a 5 point scale ranging from 1 (not at all important) to 5 (extremely important).
Like uppercase superscripts indicate significant difference using Tukey's HSD Test at 0.05 level.

expressed the greatest satisfaction in the catch-experience dimension and gloomy gusses experienced the least satisfaction. There were significant differences with regard to the relax-outdoor dimension, with all groups reporting relatively high satisfaction. Again, slow action, plenty of action, and weather sensitive expressed similar levels of satisfaction, and all were significantly different from the gloomy gusses. There was no significant variation for the escape-nature dimension across the five experiential quality segments.

Lastly, overall satisfaction varied significantly across the dimensions, with plenty of action having the highest overall satisfaction and gloomy gusses experiencing the lowest overall satisfaction (Table 5).

4.0 DISCUSSION

Research suggests that satisfaction is a multi-dimensional construct. Anglers go fishing for a variety of reasons besides just catching fish (Graefe and Fedler 1986, Moeller and Engelken 1972) and non-catch motives are often more important to anglers than catch motives (Driver and Knoff 1976, Fedler and Ditton 1994). Motives have also been shown to be inextricably linked to the expected outcomes or satisfaction derived from the angler experience (Graefe and Fedler 1986). However, there is often a disconnect between anglers' reported motivations for going fishing and the attributes of the fishing trip that contribute to a satisfying experience (Arlinghaus and Cooke 2005).

In this study, catch propensity motivations were comparatively low across the quality segments and there were no significant differences between anglers in different segments. However, satisfaction as part of the catch-experience dimension of the quality clusters was significantly different across angler segments and proved to be the most salient factor for identifying variation. This suggests that catch was an important factor in the perceived quality of the fishing trip. It also confirms the multi-dimensional nature of fishing satisfaction and suggests that anglers most enjoy just getting away and relaxing.

Graefe (1980) suggests that management policies must be tailored for particular fisheries and perhaps specific anglers. Research can inform fisheries management policies, and managers can influence attributes that add to or detract from the quality of a fishing trip. This study suggests that catch outcomes (activity-specific attributes unique to fishing) are important for Townsville area anglers; some of these attributes

Table 5.—Analysis of variance – overall satisfaction dimensions

	Slow Action		Plenty of Action		Weather Sensitive		Gloomy Gusses		OK Corral			
	M[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	*M*[a]	*SD*	F	df
Overall Satisfaction	3.62^{ABD}	0.87	4.09^{ABDE}	0.84	3.81^{CD}	0.78	2.85^{ABCDE}	0.87	3.37^{BDE}	0.77	12.80 ***	4

[a] Measured on a 5 point scale ranging from 1 (not at all important) to 5 (extremely important).
Like uppercase superscripts indicate significant difference using Tukey's HSD Test at 0.05 level.

are under managers' control to some degree (Fisher 1997). It may be useful for managers to concentrate on identifying attributes that contributed to poor quality fishing experiences among anglers in the OK Corral group since this was the largest angler segment in the study (75 respondents). It was surprising that years of fishing experience was not significantly different among the five angler segments; the specialization construct suggests that individuals with more experience would place less value on catch-related trip qualities and more on non-catch qualities with regard to satisfaction. Perhaps the participants in this study constituted a fairly homogeneous group overall.

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